## Probability Review \#1

1. You are at Macy's and you have a choice of 7 pairs of shoes, 9 pairs of socks, 11 shirts, and 15 pairs of pants. How many different outfits do you have to choose from?

$$
7 \cdot 9 \cdot 11 \cdot 15=10395
$$

2. How many different 7-digit phone numbers can be formed if the first 5 digits can be any number and the last two digits cannot be 8 .
10
1010
10109
$9=8100000$
3. How many 8 -character passwords can be formed if the first 4 characters are non-repeating letters and the last 4 characters are numbers?

4. How many different 7 -digit phone numbers can be formed if the first digit cannot be 1 or 2 , and no digit can be repeated.

5. A six sided dice is rolled 180 times. The table below represents the data distribution of the dice.

| \# on die | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| Times rolled | 30 | 45 | 30 | 28 | 24 | 23 |

a) What is the theoretical probability of rolling a 3?

b) What is the theoretical probability of rolling aneven number?

c) What is the experimental probability of rolling a

d) What is the experimental probability of rolling a number greater than 3 ?

$$
\frac{28}{180}+\frac{24}{180}+\frac{23}{180}=\frac{75}{180}=\frac{5}{12}
$$

6. When three dice are rolled, what is the probability that the first two show a 3 and the third shows an odd number?

$$
P(3) P(3) P(\text { odd })=\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{3}{6}=\frac{3}{216}=\frac{1}{72}
$$

7. When three dice are rolled, what is the probability that one die is a multiple of 3 , one die shows an even number, and one die shows a 5 ?
8. What is the probability of drawing, without replacement, 2 clubs. and then a diamond from a standard deck of cards?

$$
\begin{aligned}
& P(c l u b): P(c l u b) \cdot P(\text { diamond })=\frac{13}{52} \cdot \frac{12}{51} \cdot \frac{13}{50}=\frac{2028}{132600} \\
&=\frac{13}{850}
\end{aligned}
$$

9. What is the probability of drawing, without replacement, an Ace, then a 7, and then another Ace from a standard deck of cards?

$$
P(A C e) \cdot P(7) \cdot P(A C e)=\frac{4}{52} \cdot \frac{4}{51} \cdot \frac{3}{50}=\frac{48}{132600}=\frac{2}{5525}
$$

10. Jenny has a stack of playing cards consisting of 6 hearts, 8 spades, and 3 clubs. If she selects a card at random from this stack, what is the probability that it is a hear(or)a club? total= 17 cards

$$
\begin{aligned}
& P(\text { heart })+P(\operatorname{lnb})-P(b u t h) \\
& \frac{6}{17}+\frac{3}{17}-\frac{0}{17}=\frac{9}{17} \text { }
\end{aligned}
$$

11. Dave has a standard deck of playing cards. He picks one card out of the deck. What is the probability that it is a red card or a diamond?

$$
\begin{aligned}
& P(\text { red })+P(\text { diamond) } \\
& \frac{26}{52}+\frac{P(b u t h)}{52}-\frac{13}{52}=\frac{26}{52}=\frac{1}{2}
\end{aligned}
$$

12. Bobby has a standard deck of playing cards. He picks one card out of the deck. What is the probability that it is a 9 or a black card?

$$
\begin{aligned}
& P(9)+P(\text { black })-P(\text { both }) \\
& \frac{4}{52}+\frac{26}{52}-\frac{2}{52}=\frac{28}{52}=\frac{7}{13}
\end{aligned}
$$

13. Frank has a standard deck of playing cards. He picks one card out of the deck. What is the probability that it is a King or a spade?

$$
\begin{aligned}
& P(\text { King })+P(\text { spade })-P(\text { both }) \\
& \frac{4}{52}+\frac{13}{52}-\frac{1}{52}=\frac{16}{52}=\frac{4}{13}
\end{aligned}
$$

